Capacity Building Workshop On 'Developing CDM Projects in Asia'

Sponsored by **The Norwegian Ministry for Foreign Affairs**

4 - 5 October 2001

Exhibition Hall, TERI, New Delhi

TERI Project No. 2000GW47

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Capacity Building Workshop on 'Developing CDM Projects in Asia'

Introduction

A two-day capacity building workshop on developing Clean Development Mechanism (CDM) projects in Asia was held on 4-5 October 2001 at TERI, New Delhi. The workshop was organized by TERI and supported by the Norwegian Ministry of Foreign Affairs. The detailed agenda is given in Annexure -1.

Objective

The objective of the workshop was to

- Enhance capacity on issues relating to CDM in various sectors of government, industry, NGOs and academia in the Asian region and
- Facilitate interaction on climate change issues among the Asian countries.

Outcome

The workshop stressed the need for developing countries to be able to attract CDM projects bringing in technological, financial and sustainable benefits. The workshop covered in detail technical issues relating to CDM:

- Selection of baselines
- Establishment of additionality
- Estimation of abatement costs
- Developing bankable projects
- Monitoring , verification and certification processes of CDM

In addition, the workshop presented the perspective of relevant stakeholders: government, corporate organisations, financial institutions, and multilateral agencies.

Participants

A total of 23 participants representing the government, industry, academia, and NGOs participated in the workshop from eight different countries, Bangladesh, Bhutan, India, Indonesia, Malaysia, the Philippines, Sri Lanka and Thailand. The list of participants is given in Annexure -2

This report will detail the proceedings of the workshop together with the feedback from participants suggesting further action as a follow up to the workshop.

Inaugural Session

Summary of Inaugural session

Dr R K Pachauri, Director General, TERI communicated his appreciation to all delegates for attending the workshop and thanked the Norwegian Ministry of Foreign Affairs for providing the funds to organize the workshop. He was happy to note that the Asian Energy Institute (AEI)[1] network was well represented and hoped that more countries would join the network. He stated that there was enormous opportunity for developing countries to meet their goals of sustainable development through CDM's.

He emphasized the role of the private sector in the CDM process and called for capacity building. He urged governments take an initiative in this process and emphasised the need for better co-ordination between governments, NGOs and the industry to develop opportunities for CDM. He also called for co-operation between developing countries by way of exchanging information and sharing experiences on developing CDM projects. He however, added that even though the process of determining the nature of CDM projects would not be easy, the CDM option was a cost-effective way for developing countries to ensure sustainable development.

Dr Leena Srivastava, Director, Regulatory Studies and Governance Division, TERI, thanked the participants and organizers and also outlined the general structure of the two-day workshop. The workshop would be conducted primarily through case studies and discussions on the policy issues of CDM and on technical issues guiding the development of the CDM. Baselines, abatement costs, additionality, bankability of projects, and the monitoring and verification process would be issues covered in the workshop.

HE Ambassador A Walther, Norwegian Ministry of Foreign Affairs, in the inaugural address, spoke on the emerging environmental challenges of global warming. He stated that the threat of global warming had become apparent and that the cost of inaction would exceed the cost of action. He recognized mechanisms such as Joint Implementation (JI)/Activities Implemented Jointly (AIJ), and CDM as being important tools for implementing the Kyoto Protocol

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[1] AEI network is a network of fourteen energy institutes in Asia. The network includes institutions located in Bangladesh, China, India, Indonesia, Iran, Japan, Korea, Kuwait, Malaysia, Philippines, Sri Lanka and Thailand. TERI hosts the secretariat of the AEI

and said that these were win-win solutions to problems of emissions control. He highlighted the potential of CDM in reducing emissions in developing countries and also in facilitating technology transfer. He expressed Norway's keenness to participate in the process and in the promotion of CDM.

He emphasized the enormous scope for developing CDM projects in the energy sector of developing countries. According to statistics published by the World Energy Outlook, global energy use would increase by 60% over the next 20 years and much of it would occur in the developing world. Fossil fuels would continue to be the dominant source of energy constituting 90% of the total energy supply. Renewable energy would be an important but expensive option. Norway being a major exporter of oil and gas attaches a lot of importance to energy and environment. Norway realized the importance of energy in economic and social development and the Ambassador expressed his government's willingness to work with India in promoting renewable energy. Ambassador Walther also stated that his government was committed to Kyoto targets which were to be met by domestic as well as other means but said that it was early to talk about binding targets. He called upon all developing countries to pursue the CDM option to change the business-as-usual scenario and highlighted the need to increase capacity building in these countries for that purpose. The Kyoto Protocol was not to be seen as the ultimate end in meeting the challenge but only constituted a thirtieth part of what is required to reduce GHG concentrations. The agreement at Bonn is an important step towards realizing the Protocol and to move forward it is essential to build on Bonn and foster the global partnerships forged to meet this challenge.

Session I
Origin and evolution of the Clean Development Mechanism

Dr Sujata Gupta, Director, Policy Analysis Division, TERI, gave a brief background on global warming, the evolution of international climate change policy and the negotiation process leading up to the origin of CDM. Climate change has resulted in rise in global temperatures, and changes in precipitation patterns and quantity. The implications of these adverse climatic conditions would be severe on the developing countries, which are dependent on agriculture. Dr Gupta spoke on issues relating to changes in natural variability resulting from global warming and rise in sea level. The real concern is the rate at which these changes are occurring which give biological systems little time to adapt.

Recognizing these concerns, the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) established the Intergovernmental Panel on Climate Change (IPCC). Following this was the landmark event of the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) at the United Nations Conference on Environment and Development in 1992. The UNFCCC stated a common but differentiated responsibility for parties to the convention. In 1997, the Kyoto Protocol (KP) set emission targets for Annex I countries to cut down GHG emissions. It introduced flexibility mechanisms such as Emissions Trading, Joint Implementation (JI) and the CDM for the cost-effective implementation of emissions targets. It was pointed out that the protocol established no punitive measures for non-compliance.

It was explained that the CDM bears similarity in name to the Clean Development Fund but is radically different in structure. The CDM is the only mechanism in which developing countries can participate and can bring about cost effective GHG mitigation for the developed countries. Participation in the CDM is voluntary and must ensure real, measurable and long-term benefits and the emissions reductions are to be additional to any that would occur in the absence of the CDM project.

Some recent developments in the CDM at the resumed session of COP 6 b in July 2001 were pointed out:

- Agreement on the prompt start of CDM.
- Public funding for CDM from Annex I parties to be additional to ODA (Official Development Assistance) and other financial obligations.
- CDM projects will contribute 2% of the share of proceeds towards meeting administrative expenses and towards the adaptation fund
- Annex I parties are to refrain from using emission reductions generated from nuclear facilities
- Fast-track approval procedures will be applied to the following small-scale CDM project types
  - renewable energy projects activities with a maximum output capacity of 15 MW energy
  - efficiency improvement project activities reducing energy consumption either on the supply or demand side by up to the equivalent of 15 GWh per year
  - project activities that both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes

Discussions

A representative from the National Thermal Power Corporation (NTPC) questioned the non-consensus on the inclusion of sinks and hydro- electricity as CDM options. To this Dr Gupta replied that a lot of ground had been covered in the last agreement at Bonn. Sinks limited to afforestation and reforestation activities have been included as CDM projects, but large-scale hydro projects are not included in the fast track process due to their adverse environmental impact.

A representative from the Philippines, questioned the stability of the Kyoto Protocol without the participation of the US. Dr Gupta responded that the US's withdrawal was a set back but negotiations had continued despite that, culminating in a major agreement on the Protocol. With the withdrawal of the US, the largest emitter, the market size for CERs had shrunk from 620 million tons to 220 million tons. There were hopes though that with a change in administration in the next elections, the US would rejoin the process in the future.

It was the opinion of one participant that whether the US joined or not, capacity was needed in the developing countries to be prepared for the implementation of projects under CDM. Concern was also expressed over the preference for less expensive options by the investors.

Session II
CDM key concepts - selecting baselines and establishing additionality

Dr Sujata Gupta, Director, Policy Analysis Division, TERI, in this session introduced the participants to key issues of the CDM such as baselines, additionality, sinks, sustainable development and supplementarity. Additionality is of paramount importance to the CDM and without it there would be no incremental emissions reductions. Additionality ensures that the proposed CDM project is additional to what would have happened anyway. For a CDM project to be eligible, emissions and financial additionality are mandatory according to the Kyoto Protocol and Bonn agreement and the other additionalities namely technological, regulatory and investment additionality are desirable. The appropriateness of technology is essential and would ensure that there is no technology dumping. Financial additionality should ensure that the financial assistance from Annex 1 countries is over and above the Official Development Assistance (ODA) as accepted in Bonn.

She mentioned that the establishment of baselines adds to the cost of the project but is important for the determination of incremental costs. The different types of baselines were discussed. Emissions reduction using dynamic baselines are difficult to calculate and increase the uncertainty. Proposals for general baselines were presented as they are categorized mainly for two types of projects- renewable energy technology (RETs) and non-renewable energy technology projects (non-RETs). Standardized baselines are preferred for RETs while dynamic baselines are suitable at the sectoral level. In order to screen projects for sustainability, project benefits should be assessed for three components, economic, environmental and social.

In the case of sinks as CDM projects, Dr Gupta presented arguments for and against their inclusion. Points against their inclusion included the uncertainties, the long term commitment issues on land use, the long term impact of such projects, the lack of technology transfer in such projects, and also that sink projects bring in a situation wherein de-forestation will have to be accepted as the national baseline. Arguments in favour of sinks suggest that they would bring about equity and protect biodiversity. The issue of supplementarity of projects was also presented. Supplementarity is required to ensure that all reductions are not acquired through the flexible mechanisms. The concept of hot air was explained. Hot air is a term used when the assigned amounts are higher

than expected emissions reduction in comparison to the baseline. East European countries have hot air and these countries can transfer their surplus amounts to another country. It was also explained that all the efforts in curbing GHG emissions should eventually follow a trend wherein the North would reduce its emissions, and the South increase theirs to converge within a sustainability corridor.

Discussions

A delegate from Bangladesh questioned the feasibility of the sustainability corridor. Dr Gupta replied that, it would eventually happen and the GNP would be indicative of this.

Session III
Estimation of abatement and transaction costs

Mr Chintan Shah, Research Associate, TERI, in his presentation detailed the estimation of abatement and transaction costs of CDM's specifically to renewable energy sector projects. Talking about the generalities of renewable energy projects, Mr Shah pointed out that these were high cost options with a low plant load factor (PLF), leading to negative cash flows and huge debt servicing. Renewable projects were available mainly as centralized and de-centralized options such as solar energy (photovoltaic and thermal applications) wind energy, biomass and hybrid energy systems.

He mentioned that abatement cost is a function of the transaction cost. It was explained that abatement cost is calculated as a difference in Net Present Value (NPV) of the proposed project and baseline project by the difference in GHG emissions over the life cycle of the project. Mentioning on baselines, he said they are difficult to set, as they are hypothetical. Baselines can either be static or dynamic for both grid-connected and off-grid applications. On transaction costs, it was pointed out that generic transaction costs would include administrative and specific transaction costs. Administrative costs would include costs for approvals, service fees by financial institutions/banks, costs for project proposal preparation, monitoring, verification and certification, Executive Board proceeds and a sustainable development tax. Illustrations of the cost calculations were made using a case study on a grid-connected wind energy system.

Session IV
Identifying and formulating bankable CDM projects

Mr Pradeep Kumar Dadhich, Fellow, TERI, in this session made an presentation covering issues related to the bankability of CDM projects and approaches to identifying CDM projects. Bankable projects are real legal entities with financially strong project proponents that make them acceptable to the bank. These projects would bring in profits with their technical, economic and financial in flows. Projects need to be bankable to attract private sector investment along with financial sustainability even without CERs. It was suggested that the government should set up an institutional body to facilitate bankable CDM projects. This government body would also prepare sector status papers outlining the current status and future scenarios based on plans taking into account, baselines, new technologies and the environment.

According to Mr Dadhich, the process of developing bankable CDM projects would involve the following 8 steps:

- Step 1: Establishment of an inter-ministerial body to set sectoral working groups, prepare sectoral status papers (including historical aspects, the current status, the long term future scenario, environmental status, baseline scenarios and new technologies).
- Step 2: Identification of GHG-intensive projects, selection of the industry/utilities that are GHG-intensive, list preparation on these industries and their associations.
- Step 3: Carrying out due diligence of the selected industries and entering into a Memorandum Of Understanding with the industries/utilities and project proponents.
- Step 4: Field studies to identify baseline data, defining the project boundary, determining GHG abatement potential and cost, and preparation of project concepts.
- Step 5: Identification of investors and countries interested in CDM projects, studying guidelines and criteria of the investors/countries, submission of proposals, and/or arranging for investors to meet.
- Step 6: Involvement of the investor, selection of project and entering into a tripartite agreement and conducting a feasibility study.
- Step 7: Detailed study at selected sites detailing the technical and economic analyse of options, establishing baselines and project boundaries, estimation of GHG reduction over the life cycle of the project, calculation of incremental

cost of abatement, designing of the project implementation plan and carrying out the financial engineering of the project.

- Step 8: Tripartite meeting to arrive at financial closure.

Discussions

A (NTPC) representative from National Thermal Power Corporation Limited commented on the need to streamline the above steps for easy project implementation.

A query regarding the requirement of normal financing mechanisms was raised by a participant. Mr Dadhich responded to this saying that special financing mechanisms to finance projects would have to be devised.

Session V
Registration, monitoring and verification, and certification processes

Ms Ulka Kelkar, Area Convener, Centre for Global Environment Research, TERI, in this session outlined the project cycle with all the essential steps in the process of monitoring and verification along with institutional involvement at each step. She explained the project cycle, involving the following broad steps:

- Project development, design and financing,
- Validation/registration
- Monitoring
- Verification and
- Certification

Ms Kelkar explained the requirements for these processes as outlined in the negotiating text for mechanisms (FCCC/CP/2001/ CRP.11). Validation is a procedure by which an independent evaluation of the project activity is carried out according to CDM requirements. Validation is carried out according to set criteria such as meeting the participation requirements of the parties, incorporation of comments from the local stakeholders, submission of any impact analysis, baseline compliance, approval of the Executive Board (EB) on the monitoring methodologies, and approval of the government (on whether the project assists in sustainable development). Registration is the formal acceptance of a validated project as a CDM project activity by the EB and is a prerequisite for verification, certification and issuance of Certified Emissions Reductions (CER's). Verification is the periodic review and post-determination of monitored emissions reductions. It was explained that verification and certification were procedures by which the sufficiency of the project documentation were checked. Verification would involve inspections of the project on site, reviews of performance records, measurements, testing of monitoring equipments, monitoring methodology and results. Certification would involve the written assurance that the project activity had achieved the GHG emission reductions during a specified time period, and this would be done by the designated operational entity on the basis of verification results. The monitoring plan would involve collecting all relevant data to estimate emissions within the project boundary, determine baselines, laying out quality control procedures for the monitoring process, plan environmental impact assessments, setting procedures for periodic calculations of emissions reductions and leakage effects. The EB, would be set up for the supervision of

CDM projects and would have to specify rules and regulations regarding additionality, monitoring, verification and certification of emission reductions. These emission reductions would then be certified by operational entities

designated by the EB. The designated operational entities are would be accountable to COP/MOP through the EB.

The institutional requirements that are to be in place for monitoring and verification of CDM were explained, and the speaker stressed that this would require the establishment of a government clearance cell, independent and separate monitoring and verification agencies and would require internationally accepted guidelines to be set. It was also suggested that domestic monitoring and verification agencies would have to be trained and international or regional accreditation of these agencies would also have to be carried out.

Discussions

A question was raised about the objective of developing countries earning CERs when they were committed to GHG emissions under the Kyoto Protocol and whether there were any voluntary reductions. Ms Kelkar clarified that CERs were bankable and that developing countries could retain some of these CERs from the CDM projects to sell them at a later date depending on their market price at the time. This would require the development of a secondary market for CERs. She further added that although countries like Argentina and Kazakstan had agreed to voluntary reductions, this was overruled at the convention.

Interactive session
Summary of the questions-answers session

This session was intended to get comments from the participants and for them to discuss issues/experiences relevant to CDM. Presenters of different sessions were present to answer queries.

A representative from Bangladesh, commented on the decision taken by his government to ratify the Protocol. The government is in consultation with research institutes and NGOs and has decided to ratify the protocol and initiate the process in the country. He outlined the capacity-building needs, and its current status in his country. He informed the gathering that four institutions in Bangladesh were involved in this and many workshops had been organized to create awareness among institutions and stakeholders.

A representative from Bharat Heavy Electricals Limited (BHEL) raised the question of the future scenario with regard to a shift to cleaner fuels and control of CO_2 emissions. One presenter replied that climate change would occur if emissions were not reduced by 50%. According to him, it was difficult to achieve this but a great deal of research was on to find alternatives, to bring in cleaner technologies and these had already impacted the automobile industry. Changes in the power sector were soon expected. Reduction in emissions can be brought about by promoting small-scale projects and shifts in energy sources towards carbon-free fuels such as hydrogen. Other cheaper methods of CO_2 reductions were also being looked into like carbon sequestration by geological and oceanic sinks but were still futuristic.

A representative from Thailand stressed the need for energy and environmental auditing and enquired on the status of such services in India. In reply, it was stated that there are a small number of companies in the country, which carried out energy and environmental audits catering to the medium and small-scale industries. However most of them are energy service companies and would require additional capacity-building exercises to carry out auditing activities relating to the CDM. Their involvement would make transaction costs lower than those incurred in hiring an international organization for verification.

Delegates from Malaysia and Thailand questioned on operational entities that would be authorized to conduct the verification of projects and the prospects of

organizations undertaking environmental and energy audits in this regard. It was suggested that these would be carried out by well-known international verification organizations, however costs would be high. Dr Gupta also proposed creating a regional entity that could handle verification for the Asian region.

A delegate from Malaysia had a query about financial additionality and this was elaborated upon by Dr Gupta.

An Indonesian participant pointed out the contradiction between different regulations at the state and national level raising this issue in relation to regulatory additionality. Dr Gupta responded to this by giving the example of traffic emission standards in Delhi. It was clarified that if regulations at the local level were more stringent compared to those at national level, the projects were to abide by the former.

A delegate from Bhutan sought clarification on the exclusion of hydel projects, as this would be the main area of investment in Bhutan. Dr Gupta responded to this saying that though large-scale projects had not yet been included due to their adverse impacts small-scale projects equivalent up to 15 MW were eligible for fast track procedures.

Session VI
Government perspective of CDM and sustainable development

Mr Shashi Shekhar, Director, Ministry of Power, Government of India, in his presentation covered issues relating to the power sector in India with respect to possible CDM projects that have been considered by the ministry.

Mr Shekhar discussed the energy sector in India saying that its growth was based on large proven reserves of coal compared to oil and gas which would be available for a shorter period of time. He pointed out that though hydel energy has huge potential in India, 50% of it is not realizable because of inaccessible terrain or insurgency. For nuclear power, plans and developments are on but no major expansion is in the offing. He informed the participants that two thirds of the incremental power generation world over would be added in India and China and that they could become net emitters under the UNFCCC. He mentioned that India may ratify the Protocol in COP-7 and the country had made clear its stand of benefiting from the CDM at Berlin and was working towards it. He mentioned that detailed discussions were on in the Ministry of Environment and Forests, Government Of India (GOI), the nodal ministry for CDM projects.

The Indian government intends to target financial and investment rather than technical additionality to bag CDM projects. This could be called giving away low hanging fruits, but the GOI is prepared and is working towards this goal. It was pointed out here that the Ministry has mandated a project to TERI to identify areas where investment could be attracted, the project would also involve development of a procedure for monitoring and verification and the last phase of the project would involve tying up with an investor country.

Mr Shekhar also mentioned that the Ministry was planning to form a core group within it containing power management experts both from the demand and supply side. The Ministry of Power (MoP) had already narrowed down major areas that needed addressing in order to attain sustainable development in the Indian power sector. The scope of new technologies in coal-based power generation is being explored and a 1950 MW super critical power plant was coming up. The MoP is currently involved in a joint study with the United States Department of Energy to study the feasibility of Integrated Gassification Combined Cycle (IGCC) with Indian coal.

The speaker mentioned that other potential CDM options were the following:

- Setting up coal washeries at the pit-head for the benefaction of coal
- and modernization of existing power plants (he informed the gathering that there were approximately 250 units of 25000 MW capacity that had already completed an economic life of 25 years but had not been retired. These plants were operating at low levels of efficiency levels which needed to be raised).
- Reduction of transmission and distribution (T & D) losses of electricity (by strengthening of distribution network. According to him, a 1% reduction in T & D losses could provide an additional 700 MW of power. Thus, there is a savings potential of 10000-12000 MW and this could be formulated as a CDM option).
- Voltage stabilization of power to transformers.
- Energy conservation in the agriculture sector (this sector consumes approximately 30% of total energy)
- Energy conservation in the industrial sector (the speaker commented that a saving of 30% is possible and that huge potential exists in hospitals and at airports).

He commented that the next task of the government was to operationalize the CDM, set quick approvals, reduce transaction costs, set up strong institutional frameworks and minimize processing time so that these could facilitate a speedy operationalization of the CDM. An energy conservation bill is in the offing, which would make energy audits compulsory for a certain section of consumers.

On the Indian government's action towards CDM the crucial issues were:

- India agreeing to sign the Kyoto Protocol
- Preparing the country-capacity building, developing/shelf of projects
- Making structural changes
- Identifying efficient equipment and appliances and providing fiscal benefits for their use.

Ms S Gamlin, Ministry of Non-conventional Energy Sources, Government of India, gave a presentation on the current status of energy production and consumption in India, the potential CDM projects in the renewable energy sector in India and the status of the Government's reaction towards CDM.

Highlighting the facts, she pointed out that the per capita energy consumption of India is 0.49 tonnes of oil equivalent (toe) as compared to 8.11 in the US and 4.63 toe in OECD countries. The total installed capacity of power in India is 101,884 MW of which 70.6% came from thermal, 23.7% from hydel, 2% from nuclear and 3% from renewable sources. GHG emissions in India is around 1001352 Gg of CO_2 equivalent and India contributed 3% to the global emissions.

The energy sector contributed the most GHG emissions, 57%, 34% from agriculture, 1% from forestry and the rest from other sources. Per capita CO_2 emissions in India is 0.93 tons as compared to 20.1 tons in the US and 10.92 tons in the OECD countries. The per capita consumption of energy in India is one-sixth of that in the developed world but renewable energy is becoming more relevant. Its importance was recognized in the mid 70's and the Department of Non- conventional Energy Sources was set up in 1982, which was upgraded to a ministry in 1992. There is huge potential for renewable energy options in the country such as wind power, biomass, solar hydro and solar PV, of which only fractions have been harnessed till date. Investments in renewables in India are sizable with a total investment worth US$ 5 billion of which 75% is from private investment, 19% direct budgetary support and 6% foreign grant and external borrowings. She mentioned that the country has targets set as the vision 2012 and 10% of new capacity added in India would come from renewables (wind: 6000 MW, small hydro power: 2000 MW, biomass: 1500 MW). This would also generate one million jobs in the manufacturing, installation and servicing of renewables.

In terms of CDM opportunities in India in the renewables sector, the major decisions at COP 6.5 held at Bonn were pointed out, stressing on the positive development of a 'fast track' for CDM projects. The major issues related to CDM were baselines, additionality, CER costs and market-based programmes such as phasing out subsidies, withdrawing of incentives and full cost pricing of energy services. The potential CDM projects in the energy sector that were highlighted were:

- Small hydro sets, low-head, small hydropower generation systems and high-efficiency small hydro systems
- Technology for MW sized wind systems, control systems, rotor blade design, gear box and low wind regime systems
- Electrification of remote villages through renewal energy sources

- Advanced hybrid systems, renewable energy-based localized grid and innovative technology packages and island electrification.

The speaker mentioned that CDM projects could also be developed in areas such as:

- Fuel cell/hydrogen energy
- Alternate material solar cell
- Tandem solar PV cells
- Solar water heating for industrial applications
- Solar thermal power generation
- Electric vehicles
- Ocean energy technologies

It was pointed out that the present scenario for CDM after the resumed session of COP 6 is clearer. The developments required for CDM to take off are:

- finalization of simplified procedures for CDM projects in renewables
- rapid constitution of a CDM Executive Board
- further resolution of issues in COP 7 and
- development of a shelf of projects in the public and private sectors.

She mentioned that the Indian government expects to attract investments, receive technology through CDM, and catalyse private sector to avail CDM opportunities.

Discussions

An Indian participant from Bharat Heavy Electricals Limited (BHEL) informed the audience that there were recent reports of Pakistan cutting down T & D losses by 17-18% which Mr Shekhar thought might be largely due to commercial losses.

A representative from Philippines detailed his government's efforts in this direction. This country had targeted a 10% reduction in demand through increases in efficiency in the country. Under a renewable energy project, they had installed solar PV in 200 households. They are in the process of operationalizing a methanol-based power plant and also working with the Asian Development Bank on small projects in the renewables sector.

The representative from Thailand raised the question of additionality in renewables to which Dr Sujata Gupta pointed that the environmental damage costs should also be internalized while calculating the returns on renewables projects.

A representative from Sri Lanka expressed doubts about the affordability of renewables in remote areas without subsidies for which Ms Gamlin suggested a regulatory framework to make them mandatory and viable.

A participant from Bhutan enquired about the role of a CDM central authority and whether it would be required. Ms Gamlin responded that a central authority was essential to accelerate the whole process, as a dedicated team of the authority would be working towards this goal.

Session VII
CDM: stakeholders perspective

Mr Ajay Narayanan, Vice President, Infrastructure Development Finance Corporation (IDFC), gave a brief overview of climate change and its negotiations. He pointed out that 55% of countries worldwide were party to the Kyoto Protocol, which represented 55% of GHG emissions. Although the official implementation of CDM was to start from 2008, he mentioned that it was the right time to start the process. He highlighted that the CDM is the only flexible mechanism of relevance to India.

The main constraint IDFC faces in financing CDM projects is the non-clarity of mechanisms. The key concerns relating to the CDM were the following:

- Whether baselines would depend upon per capita emission quotas or national emissions caps
- Development concerns of non Annex I countries with regard to carbon emissions
- Non Annex I countries losing low-cost emission reduction opportunities.
- Concerns due to key Annex I countries not signing the protocol

IDFC's mission is to lead private capital to commercially viable infrastructure projects in India and the sectors in which it operates include energy, transport and logistics, telecommunication and information technology, water sanitation, solid waste, and food and agriculture. It had started work on the environment and decentralized infrastructure. The speaker pointed out the huge potential of municipal solid waste for CDM. Other IDFC initiatives possibly of relevance to CDM are in the area of solar home lighting systems and pumping, biomass-based power/biofuels, mini pico hydel, demand-side management, rural electrification and transport planning.

Mr Narayanan said that IDFC could be a source of funds for CDM projects and could also be a facilitator of projects. He mentioned financial selection criteria that are essential to project viability. Projects with a negative internal rate of return (IRR) are costly, difficult to sell and would require carbon funds. Projects with marginal IRR's would attract investment with moderate costs per ton but carbon funds would be still critical. Marginal IRR projects would be attractive for investment with a low cost per ton of carbon and also have improved viability. According to him, priority development projects for IDFC that meet

CDM criteria would be municipal solid waste management including bio methanation, composting and other municipal solid waste technologies. Other options were:

- biogas-based power
- energy efficiency in demand-side management
- public transport management for emission reductions.

Mr S Padmanaban, Senior Energy and Environment Advisor, USAID, gave a background on the effect of GHG emissions, the potential impacts of climate change and also dealt with the details and experience of AIJ projects.

Elaborating on the effect of climate change, he pointed out that the effect of man made GHGs was equivalent to a 1-% increase in the power of the sun. The impact of climate change would be sea levels raised by 1-3 feet in the next 100 years. This would bring about increased diseases, agricultural losses and losses in the world's food supply. There would be rapid changes in ecosystems with changes in climatic zones towards the poles and the mid-latitudes. There would be damage to property, increased soil erosion, flooding, cyclonic activity, storm surges, sea roughness, and torrential rain. Global warming would increase global temperatures by 1-3.5°C over the next 100 years and would be more at higher latitudes. In India global warming seems to have resulted in a rise in temperatures of the past years from 1901-1987. The average Indian maximum temperature by 0.6°C. The past two decades had the highest warming rates, with the four hottest years in the century. The speaker pointed out that projections for the Indian continent, showed that temperature rises in northern India would be greater than those in the south and that the average temperatures was expected to rise by 2.3 - 4.8°C over the next century. Climatic changes will have a direct impact on agriculture, which contributes 30% to the country's GDP and employs 68% of the work force. Rice production could decline from 0.4 to 0.75 tons/hectare along with wheat production.

Next, he detailed on a number of Activities Implemented Jointly (AIJ) projects that were carried out in India, one of them being the Integrated Demand Side Management for energy efficiency in 2 districts in Andhra Pradesh. The project was undertaken in conjunction with the Norwegian government and the International Finance Corporation. The project was to improve the efficiency of the distribution system by converting from low voltage to high voltage feeders

and by installing small capacity amorphous single core transformers. The energy efficiency measures were tested for technological, financial and economic feasibility. The state's disinterest in the project was a problem and methods had to be employed to sell the project. The project was put forward from the viewpoint of its financial feasibility and not from the perspective of climate change. There were difficulties in terms of the introduction of energy servicing companies (ESCO), where in farmers were to pay a nominal price to the ESCO which they were hesitant to.

Speaking of AIJ projects that would qualify for CDM, he mentioned an AIJ cogeneration project. Prior to AIJ projects, there was no capacity in terms of cogeneration in the Indian sugar industry. A cogeneration project brings about savings in electricity from the grid and is a novel initiative. For a cogeneration project to qualify for the CDM, the issue of additionality arises from the fact that bagasse used as a fuel for cogeneration is assumed to be carbon neutral. However, the electricity generated as a result of cogeneration would avoid drawing of power from coal based power plant and hence generation of CERs can be expected. Mentioning about another AIJ project in India relating to energy efficiency in boilers for textile units, he observed that the project would not qualify as a CDM project in India. It is so because there is an economic gain to the owners of these units if they replace the boilers, as their fuel costs reduce considerably. This has not happened due to lethargy and the short sightedness and not because of shortage of funds or lack of technology. Hence this project would not fulfil the additionality criterion required for a CDM project.
In his opinion, waste heat recovery from the metallurgical industry could be explored as a potential CDM option. According to him, dry process manufacturing of cement would not qualify as a CDM option because the net processing capacity is very low compared to dry processing today.
Mr Padmanabhan suggested financing of IGCC projects in developing countries as a CDM option with great potential. This would influence the future of generation, as newer technologies would weave their way into the generation system. He suggested that the ideal cost of CERs should be in the range of USD 30 to USD 50/tonne of carbon.

Mr M A Jeyaseelan, Senior Secretary, Business Information Services Network, Federation of Indian Chambers of Commerce and Industry (FICCI), outlined the Indian industry's prime concerns in setting CDM projects, the

Indian CDM scenario, and issues relating to enabling frameworks for industries to be active towards CDM.

Mr Jeyaseelan essentially detailed the current role of the Indian industry towards CDM. He mentioned the current status of the Indian industry is to respond to the:

- pressures of price competition in the domestic and international markets, commitments to the WTO
- downtrend in the capital market
- non availability of funds for new projects.

There is also high technology obsolescence, especially in small and medium sectors adding to the skeptisim of the industries in developing projects with new technologies. According to him, businesses operate under their own compulsions of profit margins and returns on investments and do not have emissions mitigation as their only objective. The business-as-usual scenario of industries do not perceive any additional benefits by customizing projects in the CDM format, as they appeared to be no different from any of the usual energy or environmental compliance initiatives. The other reasons for industry not being proactive towards CDM were:

- no regulatory framework that mandates emission reductions
- financial institutions apply same conventional norms for appraisal of all projects (with the exception of only non-conventional projects)
- uncertainties surrounding issues such as project type, qualification of carbon credits, structure of carbon markets and time frame for development of commercial trading for CDM projects

He mentioned several areas where the Indian industry perceived some opportunities for CDM like:

- Fuel switching
- Cogeneration
- Clean coal technologies
- Renewable energy
- Energy efficiency

He stressed that for CDM to take off in the industry some enabling framework needed to be set:

- Developing a comprehensive national fuel and feedstock policy (to facilitate fuel switching projects in power, fertilizer, cement etc.)
- Treatment of clean energy on par with non-conventional energy (for incentives and to allow special purchase prices to promote cogeneration projects)
- Creation of innovative funding mechanisms that monetize carbon credit at various levels and for different types of investors (need to facilitate venture capitalists and ESCOs and other type of funding possibilities)
- Creation of a technology pool
- Establishment of a certification mechanism

It was mentioned that the different approaches and perceptions of CDM by investors and hosts should match for their cooperation in implementing CDM projects facilitating bilateral projects under the global framework.

Mr Rahul Kshetrapal, Executive, Confederation of Indian Industries (CII), highlighted issues relating to the challenges, opportunities, risks and expectations associated with climate change partnership projects. Mr Kshetrapal mentioned that the partnership between host and investor in projects related to climate change are dependent on the:

- size of investment involved in the projects
- mitigation potential of projects
- project type and sector
- industry participation

He stressed that some of the challenges facing the creation of these projects were the:

- lack of a policy framework
- limited awareness
- interest in the industry
- lack of brokering institutions
- non-availability of funds.

He mentioned that the investment flow for climate change projects was initially expected to be $10 billion annually for the next 10 years but had now shrunk by 20% due to the withdrawal of the US from the negotiations. It is perceived that India and China are among the major contenders for investments. India has a large absorptive capacity for projects but this would depend on whether the government and industry act promptly towards CDM.

The major drivers for normal partnership projects are dependent on the environment of the host country, the market prospects and host country's regulatory features. He mentioned that for climate change partnerships, however, demand and supply of offset projects, a transparent evaluation system and the overall perspective of the host country government were essential.

The major beneficiaries from climate change project partnerships till 1998 were renewable energy followed by energy efficiency, afforestation, fuel-switching and fugitive gas capture. Clean coal technologies was another category with enormous potential. For India, the beneficiary sectors are those with high abatement potential such as power (51%), transportation (16%), steel (10%) and cement (4%). Within power generation the opportunity size for coal washing is around 5000-6000MW with an investment potential of 1.8 billion USD and an expected carbon reduction of 11 million MT. Fuel switching has an opportunity size of 3800MW and a 3.1 billion USD investment potential. The other options are conventional coal efficiency, IGCC power and renewables (which has a opportunity size of 35000MW annually, an investment potential of 25 billion USD and an expected carbon reduction of 60 million MT). Industrial energy efficiency has a high mitigation potential in iron and steel, textiles, aluminium, caustic soda, paper and pulp, fertilizer, sugar and cement industries.

He mentioned that climate change partnership projects fell into three categories:

- Short term (energy efficiency, small renewables),
- Medium term (renovation and modernization, renewables, fuel switching)
- Long term (advanced technologies such as IGCC, greenfield projects etc).

Some of the prerequisites for full-scale participation of the industry in projects are:

- low risk associated with projects
- access to technology and easy finance
- low transaction costs
- non-bureaucratic and transparent process
- reasonable costs of carbon

Discussion

Mr Shah, TERI, asked about the high cost of debt for CDM projects to which Mr Narayanan replied that marginal cost projects could be considered but high cost projects would be risky and not be considered for funding.

A participant from Indonesia questioned the role of carbon brokers. Mr Naryanan explained that these were commercial people wanting to enter the trading business and take up the role of facilitators between the host and investor party.

A representative from the National Thermal Power Corporation Limited, was skeptical about FDI coming into India after the Enron fiasco.

A government participant from the Philippines felt that in remote areas, renewables were the only option available and should qualify for CDM
An NGO participant from Sri Lanka enquired about CDM projects in the transportation sector to which Mr Narayanan replied in the affirmative commenting that better managed transport would lead to lower carbon emissions.

A representative from NTPC suggested mixing coal with edibles to reduce the quantum of emissions. Mr Padmanabhan responded that innovativeness and initiative rather than technology alone were essential to make CDM options work.

A participant asked about the stand of the US on the KP to which Mr Padmanaban replied that US believes that KP will have adverse impact on the economy. The US will have to reduce its emissions by 40% from current levels and is employing its own policy framework to cut emissions.
A representative from NTPC asked about the reason for the success of coal washeries in China. Mr Kshetrapal replied that it happened because of the government's commitment.

Session VIII
Baselines: methodologies and case studies of representative projects

Dr Y P Abbi, Fellow, TERI, made a presentation on methodologies and detailed a case study for CDM projects in the power sector, one of the largest emitters of CO_2. He explained the concepts of CERs and their cost. Areas where efficiency improvements could be brought about in order to generate CERs in the power sector were:

- Advanced power generation technologies
- Improvements in power plans
- Reduction in transmission and distribution losses
- Demand side management

The speaker explained the concept of baselines and CO_2 abatement calculations with an example. The calculation involved power and CO_2 savings.

Power generation through advanced technologies such as super critical and ultrasuper critical steam cycles, pressurized fluidized bed combustion and integrated gassification combined cycle (IGCC) were discussed. There are a number of options available in the power sector to reduce CO_2. To improve efficiency in power plants, modifications can be made in the coal milling system, boilers and generators, and by the replacement of steam turbine blades etc.

In the area of transmission and distribution of power, he suggested:

- reduction in low tension line lengths,
- use of amorphous core transformers and high-voltage single-phase distribution systems
- Installation of shunt capacitors and reconstruction of old lines

On the demand side, he mentioned efficiency can be brought about by:

- installing pumps & motors of the required rating
- switching from flood irrigation to sprinkle or drip irrigation in agriculture and
- replacing galvanized iron-based piping systems to high-density polyethylene (HDPE) systems

Load management can be achieved by:

- introducing time-of-day and seasonal pricing

- cogeneration in hotels and the process industry
- replacement of incandescent bulbs with compact fluorescent lamps (CFL)

Mr M Vipradas, Research Associate, TERI, discussed the baseline methodologies along with a case study in the area of off-grid renewables. According to him the off grid technologies are solar photovoltaic, solar thermal, biomass, wind and small hydro. He gave an overview of mixed baselines and explained issues on baselines. Baselines are dependent on application, technology and efficiency. He elaborated on solar thermal as a CDM option and on the current status of solar thermals in India. He said there are fiscal incentives available for its application. The market for solar thermal could be bifurcated into two segments, domestic and commercial. In the domestic sector, water heating for home purposes and process water heating in the commercial sector. He mentioned that the main barriers for solar thermal were high initial cost, lack of availability of the systems and their maintenance. Currently the manufacturer undertakes all tasks including marketing, financing arrangement, installation and after sales service which had led to inefficiencies. Mr Vipradas, suggested the concept of Solar Energy Services Company's (SESCo) who would be responsible for the installation of the solar system on the user's premises and in return would be paid by the user for the services. It was pointed out that this system had a high negative cash flow in the initial years and posed a high risk for the investor but assured the maintenance of the system for the user.

He illustrated a case study on solar thermal comparing it with the conventional energy generation system. It was mentioned that environmental, financial and investment additionality were easily established for solar projects but technological additionality posed problems. Concluding the presentation, he stressed the high potential and replicability of solar thermal systems but expressed caution on the probable high monitoring and verification costs as solar system projects were small and dispersed.

Discussions

A representative from NTPC questioned the time required for advanced technologies such as IGCC to come in. Dr Abbi expressed the hope that the mental frame of government and people in related fields would soon change and these technologies would be soon acceptable.

A representative from the NTPC suggested that the installation of solar panels over new buildings could be made mandatory on the lines of the rain water harvesting concept to which Mr Vipradas replied that it was possible if change in laws could be brought about.

Feedback from participants

Commenting on the workshop all participants expressed their appreciation to TERI for arranging an informative and educative workshop and also the Norwegian Ministry of Foreign Affairs for the support provided. The workshop made clear basic issues related to the CDM and allowed interaction and sharing of experiences.

All sessions were well appreciated. Sessions specifically on CDM key concepts dealing with selecting baselines and establishing additionality, stakeholder perspective on CDM and sessions on baselines methodologies using case studies of representative projects were most appreciated. However, participants expressed view that sessions on case studies detailing on project methodologies, identifying and formulating bankable mitigation projects and estimation of abatement and transactions costs should have been in more detail.

It was suggested that a similar workshop be organised after COP-7 to provide updates on the latest issues. Suggestions were also made to conduct detailed workshops on specific issues related to estimation of abatement costs and transaction costs through individual case studies and on base line issues which were important in selecting appropriate CDM options.

With the imminent operationalization of CDM after COP-7 it was mentioned that creating awareness among sectors of countries in the Asian region for co-ordination and developing CDM projects was essential. It was apparent that in the Asian region, awareness of CDM was high at the governmental level and the government's were generally receptive to relevant issues and were in fact pursuing them actively to develop potential projects. However the level of awareness of CDM issues was very low among the industrial sector and civil society. The participants urged exercises towards creating greater awareness and capacity-building in these sectors.

Specific sectoral level workshops among countries in the Asian region were suggested to exchange information on the kinds of CDM projects developed by each country in sectors such as fossil fuels, renewables, industrial energy, forestry etc. Commenting on the CDM potential in their respective countries almost all the countries represented in the workshop were actively seeking projects in the sectors of renewables and industrial efficiency (India, Indonesia,

Malaysia, Philippines, Sri Lanka, and Thailand). The area of fossil fuel was being explored for potential CDM projects in Bhutan, India, Indonesia, Malaysia, Philippines and Thailand. Apart from these, it was mentioned that the following specific options were being considered:

- Hydro electricity for renewables in Bhutan
- Forestry in Bhutan
- Geothermal for the renewable option in Indonesia,
- Transmission and Distribution losses conservation in demand side management in Indonesia
- Methane emissions reductions in Thailand
- Transportation sector in Sri Lanka

In the longer term, participants suggested that TERI conduct similar workshops for the Asian region. The issues in which participants considered awareness and capacity building essential regarding CDM were:

- Sectoral options
- Organizational and functional responsibilities at the international and country level
- Project proposal preparation
- Issues for negotiations at major Conference Of Parties
- Procedures and compliance details
- Host-investor participatory issues
- Government perspective of CDM in Asia
- Case studies/analysis of options with CDM rules
- Regional CDM activities

It was suggested that TERI could be the nodal agency for networking and dissemination of information on CDM issues for the Asian region. Suggestions were obtained for:

- Networking between countries and sectors for information sharing,
- Creation of a website to disseminate latest information relating CDM issues in the Asian region
- Formation of specific working groups for discussing and exchanging cross country information and experiences on CDM and related issues
- Preparation of a manual/model for countries on the implementation of CDM projects.

Annexure - 1

CAPACITY BUILDING WORKSHOP ON DEVELOPING CDM PROJECTS IN ASIA

Supported by the Norwegian Ministry of Foreign Affairs

4 – 5 October 2001

TERI, New Delhi, India

Agenda

Day 1: Thursday, 4th October, 2001

0930 - 1000	Welcome and introduction to the workshop *Dr R K Pachauri, TERI* *Dr Leena Srivastava, TERI* Inaugural address *Ambassador A Walther, Norwegian Ministry of Foreign Affairs* Vote of thanks *Dr Leena Srivastava, TERI*
1000 - 1030	Origin and evolution of Clean Development Mechanism *Dr Sujata Gupta, TERI*
1030 - 1100	Coffee break
1100 – 1200	CDM key concepts: Selecting baselines and establishing additionality *Dr Sujata Gupta, TERI*
1200 – 1300	Estimation of abatement costs and transaction costs *Mr Chintan Shah, TERI*
1300 - 1400	Lunch
1400 – 1500	Identifying and formulating bankable mitigation projects: step-by-step approach *Mr Pradeep Kumar Dadhich, TERI*
1500 – 1600	Registration, monitoring and verification, and certification processes *Ms Ulka Kelkar, TERI*
1600 - 1630	Coffee break
1630 - 1730	Interactive session

Day 2: Friday, 5th October 2001

0900-1020	Government perspective on CDM and sustainable development *Mr Shashi Shekhar, Ministry of Power*
1020 -1050	Coffee break
1050-1120	Government perspective on CDM and sustainable development (contd.) Ms S Gamlin, Ministry of Non-conventional Energy Sources
1120 -1215	Stakeholders perspective [session one] *Mr Ajay Narayanan, IDFC*
1215-1300	Baselines: Methodologies and case studies of representative projects (Power sector) Dr *Y P Abbi, TERI*
1300-1400	Lunch
1400 -1600	Stakeholders perspective [session two] *Mr M A J Jeyaseelan, FICCI* *Mr Rahul Kshetrapal, CII* *Mr S Padmanaban, USAID*
1600-1630	Coffee break
1630 -1715	Baselines: Methodologies and case studies of representative projects (Renewables) *Mr M C Vipradas, TERI*
1715-1800	Discussion and feedback

Annexure -2

Capacity Building Workshop on Developing CDM Projects in Asia

4-5 October 2001

Organized by TERI, New Delhi

Supported by Norwegian Ministry for Foreign Affairs

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Annexure - 3

Capacity building workshop on

Developing CDM Projects in Asia

4-5 October 2001

TERI, New Delhi

Supported by Norwegian Ministry for Foreign Affairs

Feedback survey

1. Which session(s) in this workshop did you find most useful?

____

____

2. What issues do you think should have been covered in more detail?

____

____

3. Do you think there should be follow-up to this workshop? Yes / No

4. If yes, what kind of follow-up action do you suggest?

____

____

5. Any other general comments or suggestions about the workshop.

____

____

____

6. Which areas/sectors have the highest potential for CDM projects in your country?

- ☐ Fossil fuel electricity generation ______________________
- ☐ Renewable energy ______________________
- ☐ Industrial energy efficiency ______________________
- ☐ Forestry ______________________
- ☐ Others (please specify) ______________________

7. What is the general attitude of the government towards CDM in your country?

- ☐ Actively exploring CDM opportunities
- ☐ Generally receptive
- ☐ Low level of interest
- ☐ Cautious
- ☐ Opposed
- ☐ ______________________

8. How would you characterize the level of awareness about CDM among industry and civil society in your country?

____

____

____

9. What do you feel are the major capacity building needs for Asian countries to benefit from the CDM? What steps need to be taken to best address these needs?

____

____

____

10. Any other information or views that you would like to share.

____

____

____

____

Name ______________________

Organisation ______________________

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P. O Box 8114 Dep.
N-0032, Oslo
Norway

Sub: Report on the capacity building workshop on "Developing CDM Projects in Asia".

Dear Mr Walther,

This is with reference to the capacity building workshop on "Developing CDM Projects in Asia" organised by TERI on 4 -5th October 2001 at TERI New Delhi.

We thank the Norwegian Ministry of Foreign Affairs for the financial support provided in organising this workshop. We feel that the concept of this workshop was much appreciated by the participants not only from other Asian countries but also from India. In fact, they recommended organization of similar workshops from time to time. Further the participants suggested preparation of a manual on the subject.

A report on the proceedings of the above workshop is attached herewith for your perusal.

We are keen to pursue the suggestions made by the participants and look forward to hearing your views on the same.

With best regards,

Yours sincerely,

Preety Bhandari

Preety Bhandari

CC: Ms Agnete Eriksen, Councellor (Development and Commercial)
Royal Norwegian Embassy, 50-C Shantipath, New Delhi -110021.